



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

face; but a week of rainy weather brought most of the rest to the surface in some form or other. Nine out of twenty-five sent the lower end of the radicle, with its roots, from three-fourths to two and one-half inches above the surface. The plumule for a time remained green, and the cotyledons were not yet exhausted; but in time all of these perished without bringing any green leaves to the surface.—*W. J. Beal, Agricultural College, Mich.*

#### EXPLANATION OF THE PLATE.

No. 1. The first of those to come up, where the hilum was placed uppermost, usually took the form of this figure.

No. 2. This represents one of those in which the hilum was placed uppermost.

No. 3. In this case the seedling is still struggling to send its plumule to the surface. The cotyledons, which were attached at C, have been rubbed off by the movements of the young plant through the sand.

No. 4. One plant is here represented in which the partially-exhausted cotyledons had been rubbed off.

No. 5. This represents one specimen in which the cotyledons have disappeared and the plumule has decayed.

No. 6. In this case the cotyledons have disappeared; the plumule and primary leaves were still green; some of the roots were still fresh in the soil, though the lower end of the radicle was elevated nearly three inches above the surface of the sand.

No. 7. Six out of twenty-five planted in open ground with the hilum uppermost were much like this figure, and likely to succeed in becoming good plants.

No. 8. Nine out of twenty-five planted as above in the open ground thrust the radicle with its roots nearly straight up out of the soil, sometimes as much as two and one-half inches, when the seedlings perished.

[All the figures were made by Will. Holdsworth.]

#### ENTOMOLOGY.<sup>1</sup>

**Note on Respiration of Aquatic Bugs.**—Among the most common insects found in our smaller ponds are those popularly known as "Water-Boatmen." Of these, the more abundant species pertain to two genera,—*Corisa* and *Notonecta*. In each of these genera the insect carries about with it, in its course through the water, a bubble of air, which it uses for respiration. At one time I kept for a considerable period several aquaria containing these insects upon the table where I was working. Some interesting phenomena connected with their respiration attracted my attention. Other duties interfered with the completion of my observations, and I now publish this note merely to call the attention of other observers to the subject.

The habits of the two genera are very different. In each the insect comes to the surface of the water at intervals to obtain a supply of fresh air; but in the case of *Corisa*, inhabiting well-aerated water, this does not seem to be absolutely necessary. The favorite attitude of the species of this genus when at rest is clinging to some object near the bottom of the aquarium; here they will remain for long periods, evincing no desire to rise to

<sup>1</sup> This department is edited by Prof. J. H. COMSTOCK, Cornell University, Ithaca, N. Y., to whom communications, books for notice, etc., should be sent.

the surface. The ventral aspect of the body at such times is covered with a film of air; and the space between the head and prothorax, and that between the prothorax and mesothorax, are also filled with air, as well as a space beneath the wings. But the quantity of air thus carried about by the insect is insufficient to account for the long period during which it remains beneath the surface of the water. By observing a *Corisa* when anchored near the bottom of a pond or aquarium, it will be seen that it clings by means of its anterior legs, and that the posterior legs are extended laterally and are frequently moved as when swimming. The result of this movement is to cause a current of water to pass over the film of air on the ventral side of the body. In this way the air may be purified as if in a tracheal gill. I was confirmed in the opinion that this air-film functions as a tracheal gill in two ways: first, when the water in which these insects were kept was allowed to become impure they became uneasy and frequently came to the surface for fresh supplies of air; second, in the case of *Notonecta* (the water-boatmen that swim upon their backs) the greater part of the air is carried beneath the wings; thus it comes in contact with the water but little, and is not, therefore, purified to any considerable extent by the free gases in the water. Correlated with this are habits very different from those of *Corisa*. The *Notonecta*, when at rest, almost invariably floats with the tip of its abdomen projecting from the water, in order that it may easily change the air under its wings.

In order to demonstrate the necessity for *Notonecta* to come to the surface frequently, I placed specimens in a closed vessel through which fresh water was allowed to run, but so arranged that the insects could not reach the open air. They made frantic efforts to push the tips of their bodies from the water. Failing in this, the air from beneath the wings in some way was accumulated on the ventral side of the body, where it at first formed a bubble of considerable size. This bubble was kneaded by the legs, and thus broken up into many small globules interspersed with water. After this the air was pushed back to the tip of the abdomen, and was again drawn under the wings. Thus it seems that the *Notonecta* can, in an emergency, avail itself of a method of purifying its supply of air, which, with the *Corisa*, is normal. I doubt, however, whether the *Notonecta* could keep itself alive in this way for a long period.—*J. H. Comstock.*

**Pedigree Moths.**—In a paper upon "Pedigree Moths," read before the London Entomological Society, February, 1887, Mr. Francis Galton, F. R. S., explained the plan and object of his proposed experiments in breeding moths, with the view of obtaining certain hereditary data needed to confirm results gained in the course of previous experimental research, when other sub-

jects than moths were treated. Mr. Galton says, "It is intended, in each case, to procure broods through a succession of selected specimens, along three lines of descent from a single pair of individuals, so that there will be three parallel broods in each generation. The particular characteristic that is selected for these experiments must admit of being accurately measured; in other respects the choice is immaterial. For brevity of explanation, I will suppose it to be size; then, starting from the brood of the original pair, (1) a few of the largest of either sex would be separated and mated; out of their progeny a few of the largest would again be taken and mated, and so on, for several generations. (2) Exactly the same process just described would be gone through, after substituting throughout the words 'medium-sized' for 'largest.' (3) Similarly, after substituting the word 'smallest' for 'largest.' The result will be to obtain a precise measure of the diminution of rate at which a divergence from the average of the race proceeds in successive generations of continually-selected animals."—*Entomologist*, vol. xx. p. 60.

**Ears of Insects.**—A correspondent calls attention to the statement made by Professor Packard, in the March number of this magazine, that locusts and grasshoppers have been "proved" to have ears. In opposition, he quotes from Dr. C. S. Minot's "Comparative Morphology of the Ear" (*Am. Jour. Otolology*, iv., April, 1882), as follows: "All attempts, however, to demonstrate the existence of an auditory organ in insects have hitherto failed. The only organs which might be interpreted as answering functionally to an ear are the so-called tympanal organs of Orthoptera; but it has not yet been demonstrated that these peculiar structures do really subserve the sense of hearing." After an abstract of Graber's researches on these organs, Dr. Minot concludes, "The preceding accounts show that we have to do with unquestionable sense-organs, although of a very unusual character. . . . As to their probable functions, we possess no satisfactory indication; but it seems particularly improbable that they are auditory organs." And again, "It is certain that they are of much importance, but their physiological rôle is, we repeat, unknown."

**Relations of Ants and Aphids.**—As bearing upon our note on this subject in the *NATURALIST* for April, Professor Forbes writes as follows: "I find that, by leaning too heavily upon a considerable amount of negative evidence collected last year and the year preceding, I made an error last summer in the life-history of the corn plant-louse, *Aphis maidis*. We have succeeded this spring in finding the eggs of this species in the nests of *Lasius alienus*, in fields of corn infested by the lice the previous year, have hatched these eggs in the office, and have reared

them upon corn-roots exposed in glass tubes until all question of their specific character is removed. We also find that the ants rear the young, before the ground is planted, upon the roots of *Setaria* and *Polygonum*, common weeds in the fields, transferring them afterwards to the young corn. I judge, from the activity of the ants and the arduous character of their labors in the spring, before the plant-lice have become available as a means of subsistence, that they have independent resources. In a single instance we found dead *Bibio albipennis* dragged into the nest; but, like so many other insects at this season, the ants probably feed largely upon the fluid exudations of plants."

**Exposition of Insects.**—There will be held in Paris, beginning on the 27th August and lasting until 28th September, 1887, an exposition of useful insects and their products, and of noxious insects and specimens of their injuries. This exposition is conducted by the Société centrale d'Apiculture et d'Insectologie, under the patronage of the Ministre de l'Agriculture. There is also to be given in this exposition a place for insecticides, and various devices for destroying insects. It is to be opened to foreign as well as French exhibitors.

**Entomological News.**—Mr. L. O. Howard gives, in the *Transactions of the American Entomological Society*, vol. xiii. pp. 169–178, a generic synopsis of the *Proctotrupidæ*, based upon that which appears in Dr. Foerster's "Hymenopterologische Studien." The synopsis includes one hundred and thirteen genera, of which twenty-nine are represented in this country; these are indicated by an asterisk.—In the same volume, p. 179, Mr. Charles A. Blake gives a monograph of the *Mutillidæ* of North America. The genera, and also the species, are separated by analytical tables. Many new species are described, bringing the number of known species up to about one hundred and thirty.—Williston also gives (l. c., p. 308) a catalogue of the described species of South American *Syrphidæ*. About three hundred species, representing about forty genera, are enumerated.—Dr. Gustav Mayr publishes a paper on the ants of the United States of America, in the *Verh. k. k. Zool.-Bot. Ges. in Wien*, pp. 419–468. This paper is a synonymical and descriptive list of forty-eight pages, in which one hundred and seven species, representing thirty-four genera, are given. Fourteen new species are described.—Mr. Grote has published, in Bremen, a small work on the "Hawk-Moths of North America."—Dr. Riley has published Bulletin No. 10 of the Division of Entomology, U. S. Dept. Agr., entitled "Our Shade-Trees and their Insect Defoliators, being a consideration of the four most injurious species which affect the trees of the Capital, with means of destroying them." The imported elm-leaf-beetle, the bag-

worm, the white-marked tussock-moth, and the fall web-worm are the insects discussed.—The *Proceedings of the Natural History Society of Wisconsin* for April devotes forty-two pages to a paper on the special senses of wasps, by G. W. and E. G. Peckham.

## ZOOLOGY.

**The Fauna of Liverpool Bay.**—A short time ago, at the instigation of Professor W. A. Herdman, of Liverpool, England, the "Liverpool Marine Biological Committee" was formed, the object of which was to explore the fauna of Liverpool Bay and the adjacent seas. The first report of this committee has recently been published, and occupies three hundred and seventy pages, with ten plates and two maps, of vol. xl. of the "Proceedings" of the Liverpool Literary and Philosophical Society. Persons interested loaned tugs and steamers for the purposes of dredging, and the additions made to the knowledge of the fauna of the Irish Sea are very considerable. The specimens collected were turned over to specialists to work up, and from their reports and lists of species it has been found that of the nine hundred and thirteen species recorded, two hundred and thirty-five were new to the region embraced; sixteen were never before reported from the British seas, and of these seven species and three varieties are new to science. Of the special reports on the different groups we can only allude to Professor A. Milne Marshall's excellent sketch on shallow-water faunas, and that of the Rev. H. H. Higgins on pioneers in local biology. Professor W. A. Herdman in a supplementary paper deals with variability in the tunicates, while J. H. Gibson discusses the systematic value of the spines of the polychætous worms, coming to the conclusion that they are of but moderate importance. There are a few notes on the attempted introduction of the quahog (*Venus mercenaria*), which does not appear to have been successful. Among the projects outlined for the future is a systematic examination of the fauna between tide-marks. This littoral zone is to be divided into belts, corresponding to its elevation above low-water mark, and each belt is to be examined separately with a view of ascertaining, among other points, the daily submergence which each species requires.

**The Systematic Position of the Sponges.**—Dr. G. C. J. Vosmaer, in the concluding portion of his volume on the Porifera in Bronn's "Klassen und Ordnungen des Thierreichs," discusses the various views held as to the relationships of the sponges, and advances some ideas of his own, which, from his familiarity with the subject, are worthy of attention. He divides the sponges